Pol. J. Appl. Sci., **2023**, 9, 30-34

THE IMPACT OF VACUUM CUPPING THERAPY ON RANGE OF MOTION, PAIN REDUCTION, AND MUSCLE TENSION IN WOMEN PRACTICING POLE DANCE

Agata Kupczak, Kacper Zając

Department of Sports Medicine and Exercise Physiology, Medical University of Silesia, Katowice, Poland

E-mail: agata.aleksandra7@gmail.com

Abstract

Objective: The aim of the study was to evaluate the effects and effectiveness of vacuum cupping therapy and its impact on the musculoskeletal system, specifically assessing its effects on women practicing pole dance.
Materials and Methods: The effects of vacuum cupping therapy were examined in a group of women engaged in pole dance training. Two separate studies were conducted, each with 30 participants. Study 1 focused on the impact of cups on pain and/or muscle tension, using assessments such as the Visual Analog Scale (VAS). Study 2 examined the effects of cupping therapy on the range of motion by relaxing the posterior fascial chain of the lower limbs, and the results were evaluated using the Thomayer test.
Results: In Study 1, positive effects of vacuum cupping therapy were observed in 28 participants, negative reactions were noted in only 1 study participant, and no impact of the therapy was reported by 1 participant. In Study 2, the expected results were achieved in 28 participants, while 2 participants showed no influence of vacuum cupping therapy on the range of motion.
Conclusions: Vacuum cupping therapy has a positive impact on the musculoskeletal system, inducing relaxation of tense muscles, reducing perceived pain, and excessive tension. The therapy yielded favourable effects in the study group, consisting of women practicing pole dance.

Key words: vacuum cupping therapy, musculoskeletal, muscle tension, pole dance, training

DOI: 10.34668/PJAS.2023.9.4.05

Introduction and objective

Vacuum cupping is a therapeutic method belonging to the field of natural medicine. Its effectiveness stems from the achieved therapeutic effects, yet there is still a lack of definitive scientific evidence confirming the precise mechanism of action and its impact on the human body. Vacuum therapy is increasingly utilized by athletes as a form of self-therapy for pain and post-training regeneration, as well as by physiotherapists as a tool to enhance therapeutic interventions [1-3].

Vacuum cups exert influence on various systems within the human body, comprising a comprehensive phenomenon aimed at natural regeneration and support for self-healing processes [2,4]. The circulatory and immune systems are stimulated under the influence of vacuum therapy. The inflammatory state induced by cupping therapy triggers a cascade of immune processes in the body, leading to increased proliferation of leukocytes. Creating a controlled inflammatory state at the cupping site enhances blood circulation, thereby stimulating metabolic processes and improving blood supply to surrounding tissues. Vacuum cups also have draining effects, aiding lymphatic flow and promoting enhanced fluid exchange in tissues due to increased blood circulation in the body [2,5,6].

The placement of a cup influences the nervous system, sending information to the brain about ischemic conditions. While the cup is applied to a specific area, blood flow is reduced, creating an apparent state of tissue ischemia that stimulates the nervous system to send more red blood cells to that location. The resulting increased blood flow in surrounding tissues serves as a therapeutic stimulus for the body, accelerating regenerative processes. The normalization of tension in the musculofascial system has a calming effect on an overstimulated and overloaded nervous system [2,4,6].

The negative pressure created by vacuum cups affects tissues up to 10 cm deep from the cupping site. By influencing fascial and muscular structures, the cups induce a sensation of "stretching," similar to the effect of applied compression for loosening surrounding tissues. The stimulus has a relaxing, stretching, and tension-normalizing effect on fascia and muscles [7,8].

Vacuum therapy is increasingly employed in physiotherapy as a tool that, with minimal effort, activates a range

of stimuli and regenerative processes affecting the musculofascial system.

Objective of the Study

The aim of this study was to assess the effects and effectiveness of vacuum cupping therapy and its impact on the musculofascial system. The intention was also to determine whether vacuum therapy is effective for pole dance athletes and whether it can yield positive effects in this group of athletes.

Materials and Methods

The tests were conducted as two separate studies, with female pole dance practitioners participating in both studies. Study 1 assessed the impact of vacuum cupping therapy on pain reduction and/or muscle tension in women practicing pole dance.

To participate in the study, individuals had to meet the following criteria:

- Female gender,
- Age 18 or older,
- At least 12 hours elapsed since the last intense physical activity,
- Regular practice of pole dance for a minimum of 1 month,
- No contraindications to vacuum cupping therapy,
- Experience pain or muscle tension causing discomfort.

Thirty women participated in the study. For result verification, a Visual Analog Scale (VAS) was used to assess pain, and a proprietary 5-point scale was used to evaluate muscle tension. Vacuum therapy employed non-flammable vacuum cups with a diameter of 5 cm, and the suction force was generated using a manual pump. The treatment duration was 10 minutes. The suction force was adjusted according to the patient's sensations, aiming for a noticeable but tolerable "pulling" sensation. Cups were placed in the area where the patient experienced pain or discomfort.

Fig. 1. Example Application of Cups during Study 1.

Fig. 2. Reaction after Cupping in a Sample Application.

Study 2 aimed to verify the impact of vacuum cupping therapy on the range of motion by assessing the flexibility of the muscles in the posterior thigh and calf. This assessment was conducted before and after the application of cupping therapy.

To participate in the study, individuals had to meet the following criteria:

- Gender female,
- Age 18 or older,
- At least 12 hours elapsed since the last intense physical activity,
- Regular practice of pole dance for a minimum of 1 month,
- No contraindications to vacuum cupping therapy,
- No recent injuries or lower limb injuries affecting the range of motion.

Thirty women participated in the study, and the effects of therapy were verified using the Thomayer test before and after the procedure.

Fig. 3. Cupping Placement Scheme in Study 2.

Results

The Thomayer test was conducted in three repetitions before and after the cupping therapy. All results were recorded, and only the best obtained attempts were considered for analysis. Participants performed a forward trunk flexion while standing, with extended lower limbs, without bending the knee joints, and with their feet together, without shoes. The distance was measured from the third finger.

The results of the analysis of the best obtained attempts before and after cupping therapy will be presented graphically, illustrating potential changes in the range of motion of the muscles in the posterior thigh and calf. For better clarity, the results may be presented in the form of charts or tables.

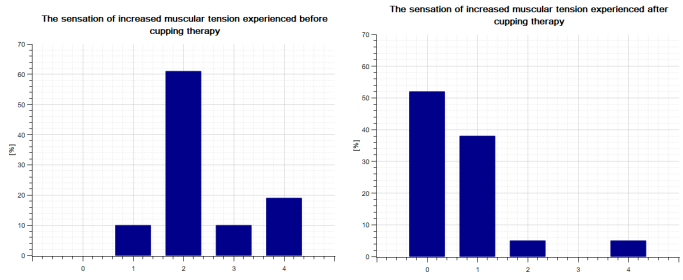

Fig. 4. Assessment of Perceived Increased Muscle Tension Before and After Cupping Therapy (n=21).

From the data obtained from the proprietary 5-point scale assessing the perception of increased muscle tension among the 21 participants, 61% (n=13) were individuals who marked 2 on the scale, indicating mild discomfort. On the scale, 4 reported a significant discomfort hindering training which accounts for 19% (n=4) of respondents. Discomfort only upon pressure in a specific area, marked as 1 on the scale, was noted by 10% (n=2) of participants, similarly, with significant discomfort marked as 3, constituting 10% (n=2) of respondents. Among all 30 respondents, individuals who did not experience increased muscle tension were excluded from the data. Respondents who marked 0 on the scale of perceived increased muscle tension were not considered in the calculation of the above data; hence, the final number of participants examined for vacuum cupping therapy for increased muscle tension was 21.

After vacuum cupping therapy, participants again filled out the scale assessing the perception of increased muscle tension. Individuals who successfully completely eliminated the perceived increased muscle tension constituted 52% (n=11) of those examined, marking 0 on the scale, indicating no perceived increased tension (freedom of movement).

Among the 21 included respondents, 43% (n=9) felt an improvement by 1 degree on the muscle tension scale. Improvement by 2 degrees was reported by 33% of those examined (n=7), and a 3-degree improvement was noted in 19% (n=4) of respondents. No changes were observed in 5% (n=1) of participants, where the perceived muscle tension was 4 on the muscle tension scale and remained unchanged after vacuum cupping therapy. No results of increased tension were found after the application of the therapy.

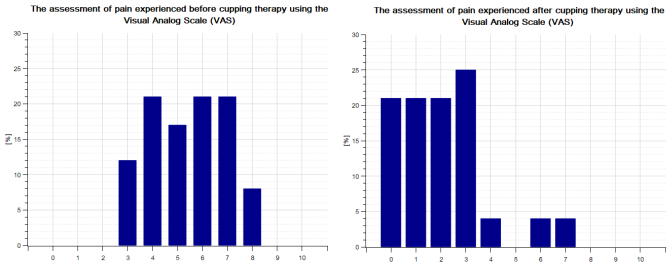

Fig. 5. Pain Level on the VAS Scale Before and After Vacuum Cupping Therapy (n=24).

Excluding respondents who marked 0 on the VAS scale, indicating no pain, results were obtained from 24 participants who qualified for the study. After applying vacuum cupping therapy, pain was reassessed on the VAS scale. Comparing the results obtained after cupping therapy with the pre-treatment data, a significant decrease in pain levels among the participants can be observed. Out of the 24 respondents, 5 (21%) achieved a score of 0 on the VAS scale, indicating no pain.

After cupping therapy, a reduction in pain on the VAS scale by 4 points was noted in 25% (n=6) of participants. The most significant pain reduction, with a difference of 6 points, occurred in 12% (n=3) of respondents. Similar results were observed for a pain reduction of 5, 3, and 2 degrees on the VAS scale, with 4 respondents (17%) respectively. A reduction in pain by 1 degree was reported by only 1 participant (4%), representing the lowest reduction on the VAS scale and the least frequently recorded among the results classified as effective pain reduction after therapy. No changes were recorded in 1 respondent, where the pain value on the VAS scale remained at 7 after cupping therapy. However, 1 participant reported an increase in pain immediately after the therapy, from a value of 3 to 6 on the VAS scale, achieving the only positive difference of 3 values among the 24 participants.

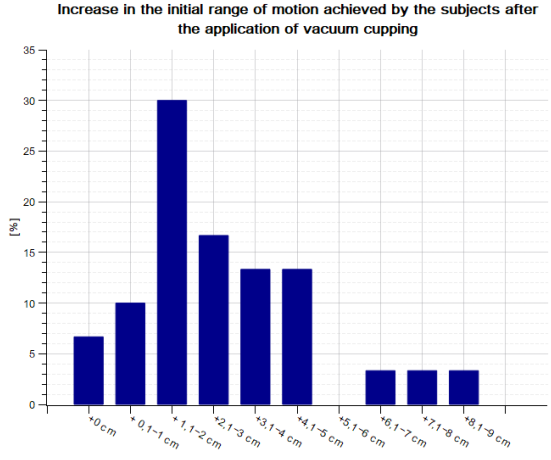

Fig. 6. Increase in Initial Range of Motion Achieved in Participants after Vacuum Cupping Therapy (n=30).

All results obtained in the Thomayer test related to ranges of motion above 0 cm. None of the participants achieved a negative range of motion. The examined individuals exhibited significant mobility. During the Thomayer test, the lowest

recorded result before therapy was +2.5 cm, and after the application of vacuum cups, it was +5.5 cm. The highest obtained result among the participants was +30 cm before therapy and +31 cm after cupping therapy.

No deteriorations in the range of motion were observed in the participants after the application of vacuum cups. The lowest recorded improvement in the range of motion was +0.5 cm, while the highest was 8.5 cm in the study. The most frequently achieved improvement in the range of motion after therapy was +1.1-2 cm in the Thomayer test, observed in 9 respondents. No correlation was observed between the initial range of motion in the Thomayer test before treatment and the result obtained after the application of vacuum cups. The range obtained after therapy was independent of the result recorded before the treatment.

Two cases were noted where there were no changes in the range of motion before and after therapy.

Discussion

In the conducted study, vacuum cupping therapy was positively received by the group of women practicing pole dance who participated in the experiment. The effects of therapy were beneficial for the majority of participants and yielded the expected results. No comparative studies were found that could be assessed with those conducted in this study. There is also a lack of randomized studies on individuals practicing pole dance or other sports groups that could be referred to for comparative purposes to assess the impact of cupping therapy on other sports disciplines. The literature reviewed does not specify the use of cups on athletes before competitions, before training, and after training. It is also essential to remember that in the study conducted in this work, as well as in many others using questionnaires and scales, it is challenging to obtain objective results and the repeatability of studies due to the subjective assessment of the participants. [12,13]

The obtained results demonstrate the impact of vacuum cupping therapy on pain reduction and increased muscle tension in women practicing pole dance. Due to the strenuous nature of this sport, excessive muscle tension and strain often lead to pain. The use of cups shows promising results in the therapy of musculoskeletal system overloads. [13,14]

Studies using the dynamic method of cupping therapy have shown an increase in the range of motion in the hips and knees. Therefore, it can be assumed that the effect was similar to performing vacuum cupping sessions on the muscles of the back of the thigh and shin, as presented in the current study, where the range of motion also increased. It is challenging to compare these studies on many levels because, despite achieving an increased range of motion in similar lower limb areas, the referenced study examined joint range of motion and used different tests to measure the obtained data. [15]

Vacuum cupping therapy is becoming an increasingly popular method of treatment and a tool commonly used by physiotherapists for their patients, as well as in sports environments. Despite being a relatively old and well-known therapeutic method, there is a lack of standardization in terms of treating ailments and its application across different patient groups. [15]

A significant problem in systematizing effective and safe cupping lies in the limited access to reliable research and literature. Most literary views have been described by practitioners of cupping therapy, containing their own observations and methods derived from the practice of vacuum cupping therapy. However, there is a lack of objective research experiences and reports justifying or discouraging specific techniques and procedures. This poses a problem in integrating cupping into the official treatment system because older translations of cupping therapy literature mostly contain general descriptions of cupping procedures. Recent reports, although valuable sources of information, are difficult to incorporate into standardized medical practice based on evidence-based medicine (EBM). Among the literature, there are few similar studies considering specific cupping placement standards, causing difficulties in comparative research. This leaves many ambiguities and issues in conducting experiments or cupping therapy. There is a lack of complementary knowledge regarding why and how to effectively apply vacuum cups. Despite a general understanding of the mechanisms occurring during cupping therapy and the benefits derived from this form of treatment, it remains a relatively unknown method in terms of application and action in specific clinical cases. [12,16]

Analysed studies have also shown that after cupping therapy, there is a significant increase in lactate levels in the tissue areas subjected to the procedure. Cups in the treated area create an ischemic state, stimulating anaerobic metabolism in cells, causing an increase in lactate levels. [17]

Most studies subjected to analysis regarding dry cupping therapy focused on the reduction of perceived pain. The effectiveness of dry cups was considered for both local cupping and cupping massage. The analysed studies showed vacuum cupping therapy as effective in treating both chronic and localized pain, such as neck, shoulder, lumbar spine overload, and rheumatic diseases. No significant incidents were observed in the studies, leading to speculation about the risk of using cupping therapy in chronic pain of various origins. [12,13,14,18-20]

Considering the comprehensive studies from both conducted experiments, despite a total of 60 vacuum cupping therapy sessions, no complications or major issues were noted in any of the examined women. Only in one case, the cups increased the perceived pain on the VAS scale from 3 to 6 points. However, these were the effects immediately after therapy and do not consider the effects over time. In the case of the next 3 individuals, the treatment did not bring any therapeutic effects, but it also did not cause negative effects. In the remaining 56 examined individuals, vacuum cups produced the expected result and influenced the musculoskeletal system.

Conclusions

1. Vacuum cupping therapy has a relaxing effect on the musculoskeletal system, inducing a stretching-like effect.
2. Vacuum cupping therapy demonstrates positive outcomes for women practicing pole dance as a sports discipline,

particularly in terms of post-training recovery by reducing perceived pain and discomfort associated with musculoskeletal overload.

3. Despite the high flexibility of the study group in the Thomayer test, vacuum cups exert a significant influence on the tissues, effectively passive stretching the muscles of the posterior thigh and calf.
4. Vacuum cups can serve as valuable tools in the practice of physiotherapy.

Literature

[1] Piotrowski H. Red. Sztuka stawiania baniek. Cedrus Publishing House; Warszawa 2000, wyd. I. : 13-56, 103-119, 129-133.

[2] Gilmartin S. Red. Współczesna terapia bańkowa. Purana; Lutynia 2018, wyd. I. : 12-25, 41-65, 72-118, 133-176.

[3] Mehta P, Dhapte V. Cupping therapy: A prudent remedy for a plethora of medical ailments. Journal of Traditional and Complementary Medicine 2015; 5 (3): 127-134.

[4] Banasiewicz T, Zieliński M. Red. Terapia podciśnieniowa ran. Termedia Wydawnictwa Medyczne; Poznań 2015, wyd. I. : 14-33.

[5] Nazimek K, Bryniarski K. Aktywność biologiczna makrofagów w zdrowiu i chorobie. Postepy Hig Med Dosw (online) 2012; 66: 507-520.

[6] Lowe T D, Cupping therapy: An analysis of the effects of suction on skin and the possible influence on human health. Complementary Therapies in Clinical Practice 2017; 29: 162-168.

[7] Chaitow L, Saulicz E. Red. Metody terapii manualnej w leczeniu dysfunkcji powięziowych. Edra Urban & Partner; Wrocław 2015, wyd. I. : 93-103, 131-148, 151-156, 257-265.

[8] Oellerich H, Wessels M. Red. Masaż bańką chińską : innowacyjna i skuteczna technika rozluźniania powięzi. Vital; Białystok 2020, wyd. I. : 16-26,40,65,77.

[9] Palos S. Red. Chińska sztuka leczenia. Luna. Wrocław 1993, wyd. I. : 57-119,209-211.

[10] Stecco A, Stecco L. Red. Manipulacja powięzi w leczeniu dolegliwości bólowych układu ruchu. ODNOVA-MED; Szczecin 2019, wyd. III. : 191-201, 239-242.

[11] Giuseppe M. Could Cupping Therapy Be Used to Improve Sports Performance? Journal of Functional Morphology and Kinesiology 2016; 1: 373–377.

[12] Huijuan C, Mei H, Xun L, Shangjuan D, Yongmei S, Qian W, Shu X, Jianping L. Clinical research evidence of cupping therapy in China: a systematic literature review. BMC Complementary and Alternative Medicine 2010; 10 (70): 1-10.

[13] Akbarzadeh M, Ghaemmaghami M, Yazdanpanahi Z, Zare N, Azizi A, Mohagheghzadeh A. The Effect Dry Cupping Therapy at Acupoint BL23 on the Intensity of Postpartum Low Back Pain in Primiparous Women Based on Two Types of Questionnaires, 2012; A Randomized Clinical Trial. International Journal of Community Based Nursing & Midwifery 2014; 2 (2): 112-120.

[14] Moura CC, Chaves ECL, Cardoso ACLR, Nogueira DA, Corrêa HP, Chianca TCM. Cupping therapy and chronic back pain: systematic review and meta-analysis. Revista Latino-Americana de Enfermagem 2018; 26: 1-15.

[15] Murray D, Clarkson C. Effects of moving cupping therapy on hip and knee range of movement and knee flexion power: a preliminary investigation. Journal of Manual & Manipulative Therapy 2019; 27 (5): 287–294.

[16] Cao H, Li X, Liu J. An Updated Review of the Efficacy of Cupping Therapy. PLoS ONE 2012; 7 (2): 1-14.

[17] Emericha M, Braeunig M, Clement H W, Lüdtke R, Huber R. Mode of action of cupping——Local metabolism and pain thresholds in neck pain patients and healthy subjects. Complementary Therapies in Medicine 2014; 22 (1): 148-158.

[18] Lauche R, Cramer H, Hohmann C, Choi K-E, Rampp T, Saha J F, Musial F, Langhorst J, Dobos G. The Effect of Traditional Cupping on Pain and Mechanical Thresholds in Patients with Chronic Nonspecific Neck Pain: A Randomised Controlled Pilot Study. Evidence-Based Complementary and Alternative Medicine Volume 2011; 2012: 1-10.

[19] Ma S, Wang Y, Xu J, Zheng L. Cupping therapy for treating ankylosing spondylitis: The evidence from systematic review and meta-analysis. Complementary Therapies in Clinical Practice 2018; 32: 187-194.

[20] Saha J F, Schumann S, Cramer H, Hohmann C, Choi K-E, Rolke R, Langhorst J, Rampp T, Dobos G, Lauche R. The Effects of Cupping Massage in Patients with Chronic Neck Pain – A Randomised Controlled Trial. Complementary Medicine Research 2017; 24 (1): 26-32.

Received: 2023
Accepted: 2023